

CLAIM LISTING

1. (original)A method of forming a microelectronic structure comprising:
forming a first thickness of an epitaxial germanium layer on a sacrificial silicon layer;
removing a predetermined amount of the epitaxial germanium layer to form a second thickness of the epitaxial germanium layer;
activating the epitaxial germanium layer and an oxide layer disposed on a silicon substrate in an oxygen plasma; and
bonding the epitaxial germanium layer to the oxide layer.
2. (original)The method of claim 1 wherein bonding the epitaxial germanium layer to an oxide layer disposed on a silicon substrate comprises forming a germanium oxide interface between the epitaxial germanium layer and the oxide layer.
3. (original)The method of claim 1 wherein forming the first thickness of the epitaxial germanium layer on the sacrificial silicon layer comprises forming a graded buffer layer on a sacrificial silicon layer and then forming a first thickness of the germanium layer on the graded buffer layer.
4. (original)The method of claim 1 wherein removing a predetermined amount of the first thickness of the epitaxial germanium layer to form a second thickness of the epitaxial germanium layer comprises polishing a predetermined

amount of the first thickness of the epitaxial germanium layer by chemical mechanical polishing to form a second thickness of the epitaxial germanium layer.

5. (original)The method of claim 4 wherein polishing a predetermined amount of the first thickness of the epitaxial germanium layer by chemical mechanical polishing to form a second thickness of the epitaxial silicon germanium layer comprises polishing a predetermined amount of the first thickness of the epitaxial germanium layer by chemical mechanical polishing to form a surface roughness in a second thickness of the epitaxial germanium layer of about 5 angstroms or less.

6. (original)The method of claim 1 wherein bonding the epitaxial germanium layer to the dielectric layer comprises bonding the epitaxial germanium layer to the oxide layer to form a composite substrate.

7. (original)The method of claim 1 wherein activating the epitaxial germanium layer and an oxide layer disposed on a silicon substrate in an oxygen plasma comprises activating the epitaxial germanium layer and an oxide layer disposed on a silicon substrate, wherein the oxide layer is about 1,000 angstroms in thickness, in an oxygen plasma.

8. (original)The method of claim 1 wherein removing a predetermined amount of the first thickness of the epitaxial germanium layer to form a second thickness of the epitaxial germanium layer comprises removing a predetermined amount of the first thickness of the epitaxial germanium layer at a rate of less than about 10 angstroms per minute to form a second thickness of the epitaxial germanium layer.

9. (withdrawn)A method of forming a microelectronic structure comprising:
forming an epitaxial germanium layer on a sacrificial silicon layer;
activating the epitaxial germanium layer and an oxide layer disposed on a silicon substrate;
bonding the epitaxial germanium layer to the oxide layer; and
removing the sacrificial silicon layer from the epitaxial germanium layer.

10. (withdrawn)The method of claim 9 wherein forming an epitaxial germanium layer on a sacrificial silicon layer comprises:
forming a buffer layer on the sacrificial silicon layer;
forming an epitaxial germanium layer on the buffer layer; and
removing a predetermined thickness of the epitaxial germanium layer to achieve a targeted epitaxial germanium layer thickness.

11. (withdrawn)The method of claim 9 wherein activating the epitaxial germanium layer and an oxide layer disposed on a silicon substrate comprises exposing the epitaxial germanium layer and the oxide layer to an oxygen plasma.

12. (withdrawn)The method of claim 9 wherein bonding the epitaxial germanium

layer to the dielectric layer comprises:

bonding the epitaxial germanium layer to the oxide layer; and
annealing the oxide layer and the dielectric layer.

13. (withdrawn)The method of claim 12 wherein bonding the epitaxial germanium layer to the oxide layer comprises bonding the epitaxial germanium layer to the oxide layer and annealing the epitaxial germanium layer and the oxide layer at a temperature between about 200 degrees Celsius to about 500 degrees Celsius for about 10 hours to about 50 hours.

14. (withdrawn)The method of claim 9 wherein removing the sacrificial silicon layer

from the epitaxial germanium layer comprises:

grinding a portion of the sacrificial silicon layer to a predetermined thickness; and
selectively etching the remaining portion of the sacrificial silicon layer.

15. (withdrawn)A method of forming a germanium on insulator structure comprising:

- forming an epitaxial germanium layer on a sacrificial silicon layer;
- removing a predetermined thickness of the germanium layer to achieve a target thickness of the germanium layer;
- activating the epitaxial germanium layer and an oxide layer disposed on a silicon substrate with an oxygen plasma;
- bonding the oxide layer to the epitaxial germanium layer to form a composite substrate;
- annealing the composite substrate;
- removing the sacrificial silicon layer from the epitaxial germanium layer of the composite substrate.

16. (withdrawn)The method of claim 15 wherein removing the sacrificial silicon layer

from the epitaxial germanium layer comprises:

- grinding the sacrificial silicon layer to a predetermined thickness;
- selectively etching the remaining sacrificial silicon layer from the epitaxial germanium layer.

17. (withdrawn)The method of claim 15 wherein forming an epitaxial germanium layer

on a sacrificial silicon layer comprises:

forming a buffer layer on the sacrificial silicon layer; and
forming an epitaxial germanium layer on the buffer layer.

18. (withdrawn)The method of claim 15 wherein removing a predetermined thickness

of the germanium layer comprises polishing a predetermined thickness of the epitaxial germanium layer by chemical mechanical polishing at a rate of less than about 50 angstroms per minute.

19. (withdrawn)The method of claim 15 wherein bonding the oxide layer to the epitaxial germanium layer to form a composite substrate comprises bonding the oxide layer to the epitaxial germanium layer to form a composite substrate comprising:

the sacrificial silicon layer disposed on the epitaxial germanium layer;
the epitaxial germanium layer disposed on the oxide layer; and
the oxide layer disposed on the silicon substrate.

20. (withdrawn)A germanium on insulator structure comprising:

an epitaxial germanium layer comprising a diameter equal to or larger than about 300 mm disposed on an oxide layer that is disposed on a silicon substrate, wherein the silicon substrate is about 300 mm in diameter.

21. (withdrawn) The structure of claim 20 further comprising a germanium oxide interface between the epitaxial germanium layer and the oxide layer that is less than about 100 angstroms in thickness.

22. (withdrawn) The structure of claim 20 wherein the oxide layer is about 1,000 angstroms thick.

23. (withdrawn) The structure of claim 20 wherein the epitaxial germanium layer is about 1,500 angstroms thick.